

MATHEMATICS POWER STANDARDS

Advanced Algebra-Trigonometry

Advanced Algebra Students will be able to:

1. Apply mathematical thinking to problem solving.

- A2.8.A. Analyze a problem situation and represent it mathematically.
- A2.8.B. Select and apply strategies to solve problems.
- A2.8.C. Evaluate a solution for reasonableness, verify its accuracy, and interpret the solution in the context of the original problem.
- A2.8.D. Generalize a solution strategy for a single problem to a class of related problems and apply a strategy for a class of related problems to solve specific problems.
- A2.8.E. Read and interpret diagrams, graphs, and text containing the symbols, language, and conventions of mathematics.
- A2.8.F. Summarize mathematical ideas with precision and efficiency for a given audience and purpose.
- A2.8.G. Use inductive reasoning and the properties of numbers to make conjectures, and use deductive reasoning to prove or disprove conjectures.
- A2.8.H. Synthesize information to draw conclusions and evaluate the arguments and conclusions of others.

2. Graph, solve, and apply quadratic functions and equations.

- A2.2.A. Explain how whole, integer, rational, real, and complex numbers are related, and identify the number system(s) within which a given algebraic equation can be solved.
- A2.2.C. Add, subtract, multiply, divide, and simplify rational and more general algebraic expressions.
- A2.3.A. Translate between the standard form of a quadratic function, the vertex form, and the factored form; graph and interpret the meaning of each form.
- A2.3.B. Determine the number and nature of the roots of a quadratic function.
- A2.3.C. Solve quadratic equations (and inequalities*), including equations with complex roots.
- A2.1.C. Solve problems that can be represented by quadratic functions, equations, (and inequalities*).

3. Recognize, graph, solve exponential and logarithmic functions and equations.

- A2.2.B. Use the laws of exponents to simplify and evaluate numeric and algebraic expressions that contain rational exponents.
- A2.1.E. Solve problems that can be represented by inverse variations of the forms $f(x) = \frac{a}{x} + b$, $f(x) = \frac{a}{x^2} + b$, $f(x) = \frac{a}{(bx + c)}$.
- A2.4.A. Know and use basic properties of exponential and logarithmic functions and the inverse relationship between them.
- A2.4.B. Graph an exponential function of the form $f(x) = ab^x$ and its inverse logarithmic function.
- A2.4.C. Solve exponential and logarithmic equations.
- A2.1.D. Solve problems that can be represented by exponential and logarithmic functions and equations.

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4. Solve systems of equations up to three variables and inequalities with two variables.

- A2.1.A. Select and justify functions and equations to model and solve problems.
- A2.1.B. solve problems that can be represented by systems of equations and inequalities.
- A2.7.A. Solve systems of three equations with three variables.
- *A2.7.B. Find the terms and partial sums of arithmetic and geometric series and the infinite sum for geometric series.

5. Recognize, use, and apply triangle and circle trigonometry.

(not in the state standards but necessary for SAT testing and PreCalculus)

6. *Graph and describe general functions and equations.

- A2.5.A. Construct new functions using the transformations $f(x - h)$, $f(x) + k$, $cf(x)$, and by adding and subtracting functions, and describe the effect on the original graph(s).
- A2.5.B. Plot points, sketch, and describe the graphs of functions of the form $f(x) = a\sqrt{x - c} + d$ and solve related equations.
- A2.5.C. Plot points, sketch, and describe the graphs of functions of the form $f(x) = \frac{a}{x} + b$, $f(x) = \frac{a}{x^2} + b$, and $f(x) = \frac{a}{(bx + c)}$ and solve related equations.

*A2.5.D. Plot points, sketch, and describe the graphs of cubic polynomial functions of the form $f(x) = ax^3 + d$ as an example of higher order polynomials and solve related equations.

7. *Find the probability of compound events.

- A2.6.A. Apply the fundamental counting principle and the ideas of order and replacement to calculate probabilities in situations arising from two-stage experiments (compound events).
- A2.6.B. Given a finite sample space consisting of equally likely outcomes and containing events A and B, determine whether A and B are independent or dependent, and find the conditional probability of A given B.

*A2.6.C. Compute permutations and combinations, and use the results to calculate probabilities.

*A2.1.F. Solve problems involving combinations and permutations.

*A2.6.D. Apply the binomial theorem to solve problems involving probability.

*A2.6.E. Determine if a bivariate data set can be better modeled with an exponential or a quadratic function and use the model to make predictions.

*A2.6.F. Calculate and interpret measures of variability and standard deviation and use these measures and the characteristics of the normal distribution to describe and compare data sets.

*A2.6.G. Calculate and interpret margin of error and confidence intervals for population proportions.